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NEW SPECIES OF NEARCTIC CADDIS FLIES.

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Recent examination of several collections of Trichoptera have revealed a number of new species ten of which are described herein. Grateful acknowledgment is made to Dr. C. P. Alexander and members of his staff at the University of Massachusetts and to Dr. R. H. Beamer of the University of Kansas for collecting the majority of the species described in this paper. Unless indicated otherwise types are in the author's collection at the University of Wyoming.

Rhyacophila ebria, n. sp.

This species, a member of the *rotunda* Banks *norcuta* Ross complex, is most closely related to *rotunda*. It can easily be separated from that species by the shorter more robust tenth tergite with a short rather than deep and wide mesal notch, by the acute rather than blunt lateral arms of the aedeagus and several other details of the genitalia.

Male.—Length 10–11.5 mm. Head, body and base of legs black, wings uniformly dark brown, apical portion of legs fuscous, antennae dark brown.

Genitalia as in fig. 1. Tenth tergite only slightly longer than wide, distal margin distinctly emarginate when viewed from lateral aspect, projected caudad to almost the same level as the basal segment of the clasper; when viewed dorsally, fig. 1A, mesal notch narrow and shallow. Basal segment of clasper gradually narrowed apically much narrower than *rotunda*, but with a similar finger-like projection of the apico-ventral corner; apical segment much deeper than long, distal margin sinuate. Ventral portion of tenth tergite is produced into a prominent complex structure consisting of a blunt dorsal process, a thin acute lateral piece and a large flat center

portion as shown in fig. 1B. Aedeagus consists of a heavily sclerotized central portion which is acute apically and projected dorsad when viewed laterally (very short and blunt in *rotunda*), ventro-apical corner produced into a long, slender acuminate point; from base arise a pair of extensile membranous arms, apex acute, covered with a dense brush of bristles, fig. 1C.

Female.—Length 11.5 mm. Identical in color and general appearance to male except more robust. Apex of abdomen drawn out into a cylindrical and unmodified tube.

Holotype. Male.—Glacier Park, Montana, Logan Pass, elevation 6660 feet, August 27, 1947, (C. P. Alexander).

Allotype. Female.—Same data as for holotype.

Paratypes.—Same data as for holotype, 8 males.

One paratype deposited in the collection of the University of Massachusetts.

Agapetus montanus, n. sp.

On the basis of the peculiarly shaped ninth tergite, the dorsally narrowed short claspers and the wide, long tenth tergite this species can easily be separated from other described species.

Male.—Length 4–4.5 mm. Body and antennae dark brown, legs luteous, wings uniformly dark brown. Abdomen with the usual ovate organ on fifth segment, mesal process on sixth sternite short, blunt, directed ventrad.

Genitalia as in fig. 2. Lateral aspect of ninth segment with dorsum narrow, sternum wide, somewhat jug-shaped in appearance. Tenth tergite bilobed from base, each lateral lobe acute apically, gradually divergent; from lateral aspect base wide, gradually tapering to an acute, dark, sclerotized point directed caudo-dorsad, cerci relatively short, practically same width throughout, six long setae present, apex truncate. Claspers, from lateral view, short, narrowed dorsally, apico-ventral corner rounded; a short distance dorsad from ventral margin is a prominent heavily sclerotized acute short point directed dorso-mesad; approximately midway along dorsal margin is a heavily sclerotized acute short point directed mesad. Aedeagus consists of a long tubular structure originating in the seventh segment.

Female.—Length 4.5 mm. Very similar to male in general appearance and size. Fifth segment with a crescentic line, sixth segment bearing a short, blunt, ventral directed mesal process. Genitalia as in fig. 2A; dorsal portion, from lateral aspect, bluntly triangular, lateral portion projected caudad and slightly ventrad as

a large flap, ventral portion projecting caudad beyond any other part of segment, apical margin of sternum truncate from ventral aspect.

Holotype. Male.—Drummond, Montana, August 11, 1931, (R. H. Beamer).

Allotype. Female.—Same data as for holotype.

Paratype.—Same data as for holotype, 4 males.

Holotype, allotype and two paratypes deposited in the collection of the University of Kansas.

Polycentropus smithae, n. sp.

This species bears closest resemblance to *iculus* Ross, but on the basis of the genitalia it can readily be differentiated from it or other members of the genus.

Male.—Length 7.5 mm. Wings light fuscous, legs and antennae a trifle lighter in color. Genitalia as in fig. 3. Ninth tergite membranous, irregular, caudal portion covered with minute setae. Ninth sternite only slightly wider than long, ventral margin produced into a very short triangular mesal projection, dorsal margin somewhat triangular when viewed from lateral aspect. Tenth tergite consists of a pair of prominent dorso-caudad directed hooks; when viewed from dorsal aspect, fig. 3A, base broad, apex acute, directed laterad; from either dorsal or lateral aspect a large spine is evident near apex and one near base, fig. 3. Cerci quite broad, orbicular. From the meso-ventral corner of the cerci there arises a pair of convergent, prominent, heavily sclerotized and ventrad directed hooks, which are partially covered by the claspers when seen from lateral aspect. Dorsad to this structure and extending to base of tenth tergite appears a flattened bell-shaped structure which is closely appressed and partially covers basal portion of aedeagus. Claspers about twice as wide as long, apex truncate; a large mesad directed tooth arises about midway along dorsal margin, fig. 3B; on the mesal surface arises a prominent triangular ridge. Aedeagus consists of a sinuate tubular dorsal part and a ventral part with apex divided into a pair of large dorsad directed lobes, apex covered with short spicules.

Holotype. Male.—Huntington Ravine, Mt. Washington, New Hampshire, elevation 5000 feet, July 17, 1942, (Marion Smith).

I take pleasure in naming this species in honor of Professor Marion E. Smith of the University of Massachusetts who collected this interesting species.

Parapsyche extensa, n. sp.

This species is most closely related to *almota* Ross but differs markedly from it and other described species in the shape of the clasper, the ninth segment and the apex of the aedeagus.

Male.—Length 12 mm. Head and body black, antennae and legs dark brown. Wings gray with a scattering of light marks over entire wing. Genitalia as in fig. 4. Ninth segment rather wide throughout, dorsum produced into a prominent pair of slightly declivous humps. Tenth tergite divided into a pair of cylindrical apically blunt, convergent arms; from dorsal aspect very similar to *almota*; base of each with a patch of fairly long setae. Claspers short, about same width throughout, dorso-distal corner truncate; thumb-like process extended considerable distance caudad, almost one-half the length of clasper, dorsal and ventral margin sinuate, apex blunt, covered with short spicules. Aedeagus with wide base, middle portion cylindrical and greatly constricted, apex irregular, membranous, sclerotized hook blunt, as in fig. 4A.

Holotype. Male.—Lassen National Forest, California, King's Creek Meadows, elevation 7500 feet, July 6, 1947, (C. P. Alexander).

Hydropsyche alvata, n. sp.

This species is closely related to *orris* Ross and *bidens* Ross, differing from these two species mainly in the apical portion of the apex of the aedeagus being short, blunt and wide.

Male.—Length 8–9 mm. Wings brownish, irrorate; similar in general appearance and structure to *bidens* and *orris*. Genitalia as in fig. 5. Ninth segment, tenth tergite and claspers very similar in appearance to that described and illustrated by Ross for *bidens* and *orris* except that the lateral lobes of the tenth tergite, from dorsal aspect, fig. 5B, is more rounded and the mesal incision is not so sharply V-shaped. Aedeagus with middle portion cylindrical, apical portion considerably widened; mesal plates relatively short and wide, apex blunt, fig. 5; mesal plates quite far apart from ventral aspect, fig. 5A; ventral cavity orbicular, mesal plates widest at apex, when seen from ventral aspect they are separated for about one-half their length.

Holotype. Male.—Jackson, Mississippi, April 24–30, 1946, (P. H. Harden).

Paratypes.—Mississippi. Same data as holotype except June 27, 1948 and March 3–10, 1946, 2 males. Illinois.—Nomence, June 24, 1936, at light, (Burks and Ayars). Michigan—Paw Paw, July

18, 1944, (J. S. Ayars). The latter two paratypic males were loaned to the author by Dr. H. H. Ross so that they might be included in the type series and are deposited in the Illinois Natural History Survey collection.

***Cheumatopsyche virginica*, n. sp.**

This is an interesting species which is probably most closely related to *sordida* Hagen but differs radically from it and other described species. The peculiar tenth tergite and the apex of the aedeagus will serve for quick identification of this species.

Male.—Length 6 mm. Color of head and body light brown, appendages and wings straw color, wings with only a faint indication of an irrorate pattern. Genitalia as in fig. 6. Ninth segment with lateral portion moderately wide throughout, sternum extended caudad beyond any other portion of segment, dorsum reduced to a narrow strap bearing two tufts of long setae. Tenth tergite fairly long, dorsal portion semi-membranous; setiferous wart bulbous, directed dorso-laterad, very prominent from either dorsal or ventral view; apical lobes directed dorsad, apex bidentate, fig. 6, mesal portion rounded, does not extend dorsad of lobes. Claspers convergent, rather short; basal segment stocky, bulbous toward apex; apical segment short, triangular. Aedeagus with basal part large, suddenly constricted and curved ventro-caudad; from ventral aspect, fig. 6A, apex greatly enlarged, lateral lobes divergent, widely separated, apex of lobes triangular, distinct notch toward base.

Holotype. Male.—Dismal Swamp, Virginia, August 13, 1934, (R. H. Beamer).

Type deposited in the collection of the University of Kansas.

***Cheumatopsyche harwoodi*, n. sp.**

This species can be separated from *wrighti* Ross, its closest relative, by the triangular apical lobes of the tenth tergite, especially when seen from the caudad aspect, and by the distinct separation of the apical lobes from the main body of the tenth tergite when seen from the lateral aspect.

Male.—Length 7.5 mm. Genitalia as in fig. 7. Color of head and body dark brown, appendages a trifle lighter in color. Wings very dark brown, no indication of an irrorate pattern. Ninth segment with small lateral lobe, dorsum considerably narrowed and bearing a paired tuft of long setae. Tenth tergite, fig. 7, short, deep; lateral setiferous wart slender, fairly long, located near ventro-

caudad corner of tergite, (longer and more slender than in *wrighti* Ross). Apical lobes of tenth tergite very wide, directed dorsad only a short distance beyond remainder; from lateral aspect they appear sinuate; setae short except slightly longer along dorsal margin especially when seen from the caudal aspect, fig. 7A, from this view caudal surface concave, lobes triangular and contiguous; from lateral aspect, fig. 7, lobes distinctly separated their entire length from remainder of tergite. Claspers similar to *wrighti* Ross, slender, apex acute and curved mesad. Aedeagus with basal part large, bulbous, apical part cylindrical; apex short, blunt.

Female.—Length 7–8 mm. Size, color and general structure identical to male. Diagnostic characters are present in the shape of the clasper receptacle which is long and narrow throughout, fig. 7B.

Holotype. Male.—Gatlenburg, Tennessee, Roaring Fork, June 7, 1947, (Paul Harwood).

Allotype. Female.—Same data as for holotype.

Paratypes.—Same data as for holotype, 4 females.

This species is named in honor of the collector, Dr. Paul Harwood of Dr. Hess and Clark Co. who collected this species.

Radema comosa, n. sp.

This species is most closely related to *sorex* Ross, it can readily be separated from *sorex* by the slender cercus, the very short basal segment of the clasper, the triangularly shaped apical segment of the clasper and several other differences in the male genitalia.

EXPLANATION OF PLATE II

FIG. 1. *Rhyacophila ebria*, male genitalia, lateral aspect; 1A, dorsal aspect of tenth tergite; 1B, ventral portion of tenth tergite, lateral aspect; 1C, apex of aedeagus, lateral aspect.

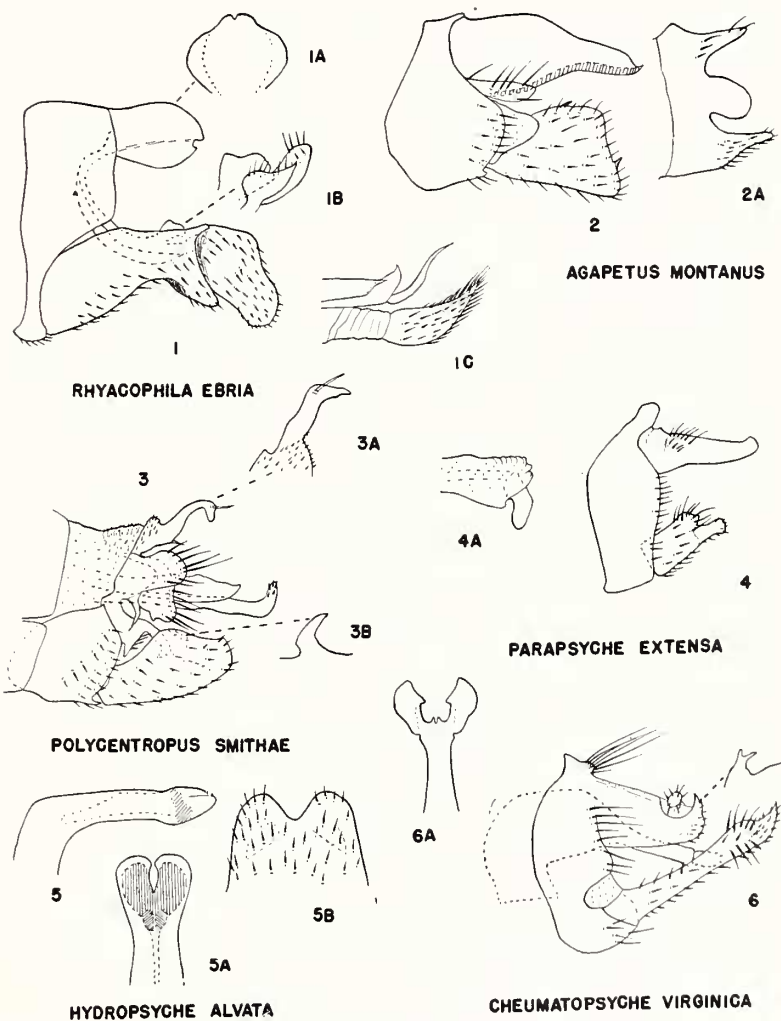
FIG. 2. *Agapetus montanus*, male genitalia, lateral aspect; 2A, female genitalia, lateral aspect.

FIG. 3. *Polycentropus smithae*, male genitalia, lateral aspect; 3A, tenth tergite, dorsal aspect; 3B, dorso-mesad aspect of hook of clasper.

FIG. 4. *Parapsyche extensa*, male genitalia, lateral aspect; 4A, apex of aedeagus, lateral aspect.

FIG. 5. *Hydropsyche alvata*, male genitalia, lateral aspect of aedeagus; 5A, aedeagus, ventral aspect; 5B, tenth tergite, dorsal aspect.

FIG. 6. *Cheumatopsyche virginica*, male genitalia, lateral aspect; 6A, apex of aedeagus, ventral aspect.



Male.—Length 8 mm. Head and body black, legs fuscous, antennae dark brown, wings dark brown with a scattering of short black setae. Spurs 1–2–2. Genitalia as in fig. 8. Ninth segment reduced on dorsum to about one-half size of sternum; arising from the dorsal portion and projecting cephalad is a thin flap-like process. When seen from the lateral aspect tenth tergite consists of the following processes: (1) a pair of dorsal acuminate appendages with base wide and extending slightly caudad beyond any other portion of genitalia, (2) a pair of prominent bilobed processes with dorsal arm long, slender, slightly widened toward apex and bearing five stout setae at apex; ventral arm one-half size of dorsal, slender throughout, bearing two stout setae apically, (3) a ventral pair of heavier widened processes, apex blunt, dorsal margin serrate; from dorsal aspect the most dorsad processes (1) are closely appressed, very slender and bear a few small fine laterad directed setae, fig. 8A, the ventral processes (3) are slightly divergent, apex sub-truncate, fig. 8B. Cerci short, slender, dorsal margin undulating, process bears a few fine setae. Clasper with basal segment short, stocky, bearing an abundance of long stout setae, seen from ventral aspect slightly wider than long; apical segment triangular, apex sub-acute, bearing a scattering of fine yellowish setae. Aedeagus with basal part arising from ventral part of eighth segment, curved dorso-caudad, dorsal arms divided from base into a pair of thin plate-like processes, acute apically, reaching caudad almost as far as dorsal

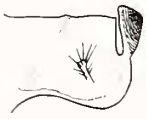
EXPLANATION OF PLATE III

FIG. 7. *Cheumatopsyche harwoodi*, male genitalia, lateral aspect of tenth tergite; 7A, apical lobes of tenth tergite, caudal aspect; 7B, female genitalia, clasper receptacle.

FIG. 8. *Radema comosa*, male genitalia, lateral aspect; 8A, dorsal portion of tenth tergite, dorsal aspect; 8B, ventral portion of tenth tergite, dorsal aspect.

FIG. 9. *Limnephilus fautini*, male genitalia, lateral aspect; 9A, cercus, dorsal aspect; 9B, apex of aedeagus, lateral aspect; 9C, female genitalia, lateral aspect.

FIG. 10. *Neothremma galena*, male genitalia, lateral aspect; 10A, apex, dorso-caudad view of lateral arm; 10B, clasper, ventral aspect; 10C, clasper, ventral aspect of paratype; 10D, clasper, lateral aspect of paratype; 10E, female genitalia, lateral aspect; 10F, female genitalia, ventral aspect of sternum.



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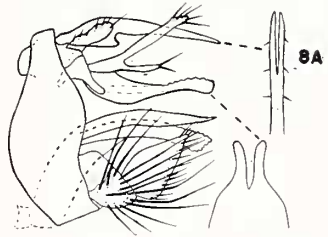


7A



7B

CHEUMATOPSYCHE HARWOODI

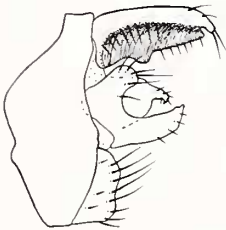


8

8A

8B

RADEMA COMOSA



9

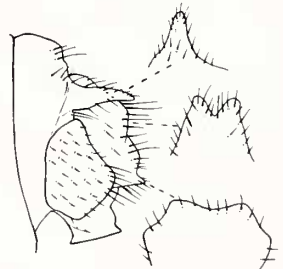


9A

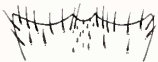


9B

LIMNEPHILUS FAUTINI



9C



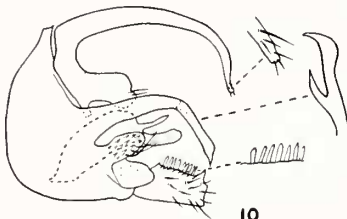
10B



10C



10E



10

10A



10D



10F

NEOTHREMMA GALENA

arm of tenth tergite; main structure cylindrical, apical margin minutely scalloped.

Holotype. Male.—Louder Ranger Station, Dixie National Forest, near Cedar Breaks, Utah, elevation 10,200 feet, June 27, 1947, (C. P. Alexander).

***Limnephilus fautini*, n. sp.**

This species can easily be separated from its closest relative *brevipennis* Banks by its smaller darker appearance (in *brevipennis* the males range from 9.5–14 mm.), by the wider clasper, the much more deeply incised tenth tergite and the apically bilobed condition of the cercus.

Male.—Length 9.5 mm. Color of head and body black, appendages and antennae brown. Wings dark brown, an abundance of light yellowish spots of various shapes and sizes scattered over wing, entire surface covered with black erect fairly long setae. Front basitarsus longer than second tarsal segment and with a slender yellow spur. Eighth tergite without any modifications. Genitalia as in fig. 9. Ninth segment with dorsum and sternum about same width, lateral portion practically three and one-half times width of dorsum. Claspers reduced, but much more prominent than in *brevipennis*, nearly same width throughout and bearing several long black setae along distal margin. Cercus, from lateral aspect, massive, directed caudad in a nearly horizontal plane, latero-ventral surface deeply excavated, apex bilobed, each blunt, ventral margin of each serrate; from dorsal aspect, fig. 9A, fused basally, apex separated into a pair of mesal lobes, and a larger sub-acute pair of lateral lobes. Tenth tergite appears from lateral aspect to be divided, lateral portion deeply incised forming a short blunt dorsal lobe and a long, caudad directed, apically acute ventral lobe; mesal part consists of two divergent lobes, base very wide, caudal portion slender, apex truncate, gradually curved ventrad. Aedeagus with lateral arms sinuate, apex forked, most cephalad branch slender and triangular, bearing a dense brush of brownish setae, most caudad branch semicircular, bearing a fringe of yellowish setae, fig. 9B.

Female.—Length 9.5–10 mm. Essentially similar in general appearance, size and color to male. Genitalia as in fig. 9C. Cercus triangular from dorsal view. Tenth tergite tubular with a V-shaped incision along apical margin of dorsal surface, separation complete although faintly marked, apical margin of ventral surface convex, most of surface of tergite bearing stout black setae.

Holotype. Male.—Albany Co., Wyoming, Snowy Range Mountains, Medicine Bow National Forest, Libby Flats, elevation 10,800 feet, July 16, 1948, (Reed W. Fautin).

Allotype. Female.—Same data as for holotype.

Paratype.—Same data as for holotype, 1 female.

I take pleasure in naming this species in honor of Dr. Reed Fautin of the University of Wyoming who collected this interesting species.

Neothremma galena, n. sp.

This species, the second described in the genus, can readily be separated from *alicea* Banks by the apex of the tenth tergite which is not divided as it is in *alicea*, and the lateral projection of the ninth segment which is divided nearly midway rather than at the apex. In addition there are several other genitalic differences.

Male.—Length 6.5–7.5 mm. Head and body dark brown, legs luteous, wings brownish throughout, about same shade of color as antennae. Spurs 1–3–4. Male palpi recurved, third segment reaching dorsad to a level about one-half length of eye, dorsal and mesal surface with a fringe of long setae. Genitalia as in fig. 10. Ninth segment with dorsum reduced to a narrow strap, lateral portion wide, sternum about five times width of dorsum, projected caudad beyond any other part of segment. Tenth tergite bilobed from base, each arm long, antennuated, distal portion curved ventrad, apex sub-acute, bearing six setae, fig. 10; ventral part of tergite divided into a pair of rather broad almost contiguous plates extending caudad a short distance over aedeagus. Caudal margin of the ninth segment produced caudad as a pair of cylindrical arms, gradually convergent but apices not contiguous, distally bent ventrad, at this point a short acute arm, fig. 10A, is produced mesad. Just ventrad to this arm arise the cerci, short, slender and covered with flat scale-like spicules. Claspers fused along meson, from ventral aspect emargination shallow, as in holotype, fig. 10B, degree of indentation is variable, as shown in paratypes, fig. 10C; from lateral aspect clasper short, about same width throughout, apex truncate, dorso-caudal corner dentate, dorsal margin with a dense fringe of lightly sclerotized, slender, scale-like setae, fig. 10, apex of clasper varies somewhat, to degree shown in paratypes, Fig. 10D. Aedeagus short, arising in ninth segment, divided into a large ventral plate and a horn-like dorsal lobe.

Female.—Length 6.5 mm. Essentially similar to male except for usual antigenetic differences. Genitalia as in fig. 10E–F. Tenth

tergite long, gradually tapering caudo-ventrad, apex blunt. Cerci subtriangular. Sternum, from ventral aspect, fig. 10F, fused along meson, incision V-shaped.

Holotype. Male.—Olympia National Park, Washington, Boulder Lake Trail, elevation 3500 feet, August 5, 1947, (C. P. Alexander).

Allotype. Female.—Same data as for holotype.

Paratypes.—Mt. Baker, Washington, Galena Camp, elevation 4000 feet, August 10–14, 1947, (C. P. Alexander), 4 males.

One male paratype deposited in the collection of the University of Massachusetts.

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NOTICE.

The Brooklyn Entomological Society is pleased to announce that Dr. J. Bequaert of the Museum of Comparative Zoology, Harvard University has accepted the editorship of **ENTOMOLOGICA AMERICANA**. All communications concerning this journal should be addressed to Dr. J. Bequaert, Museum of Comparative Zoology, Cambridge 38, Massachusetts.